

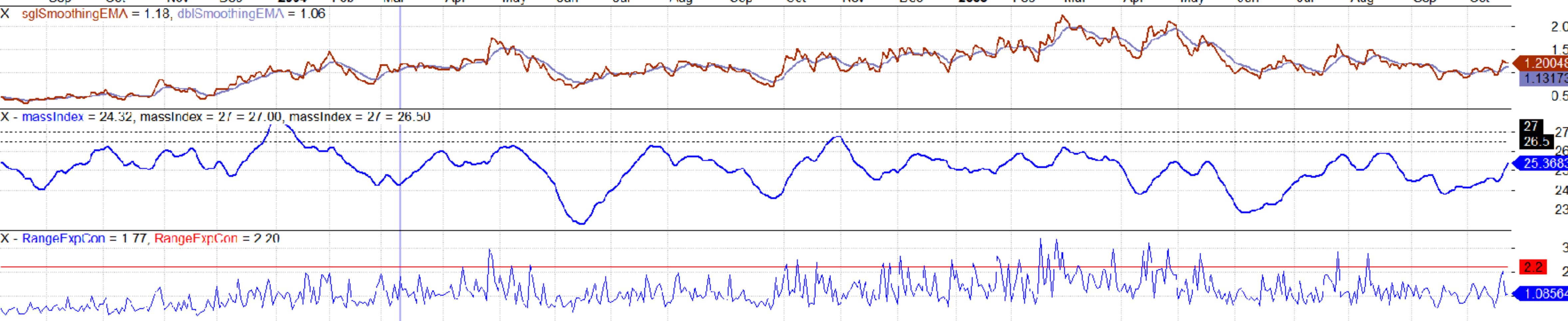


OPTION PRICING NEWBIE GUIDE

期权定价
新手指引



Conventional Stock Chart



How About Option Chart



TSLA Calls and Puts 206.60 -15.44 (-6.95%)

Expand All LIST VIEW 6 STRIKES 3 MONTHS SMART TSLA 100

CALLS										DESCRIPTION	PUTS														
OPTN...	VOLU...	BID	ASK	MARK	TIME	VALUE (%)	DELTA	THETA	IV	CLOSE	STRIKE	IV	CLOSE	THETA	DELTA	TIME	VALUE (%)	MARK	BID	ASK	VOLU...	OPTN...			
											▶ OCT 21 '22 (0 DAYS)												IV: 72.9%		
											▶ OCT 28 '22 (7 DAYS)													IV: 64.0%	
											▼ NOV 04 '22 (14 DAYS)													IV: 63.9%	
315	300	15.10	15.40	29.46	7.96	(100.45%)	0.626	-0.366	67.329%	200	66.426%	-0.349	-0.375	7.60	(95.91%)	6.74	7.60	7.80	5.79K	3.36K					
11	345	13.60	13.90	27.55	8.96	(113.07%)	0.590	-0.372	66.174%	202.5	65.736%	-0.355	-0.411	8.55	(107.89%)	7.33	8.55	8.75	1.83K	163					
267	2.03K	12.15	12.40	25.85	10.01	(126.32%)	0.554	-0.372	64.369%	205	64.974%	-0.355	-0.447	9.70	(122.41%)	8.12	9.70	9.85	1.81K	705					
6	1.77K	10.80	11.15	24.14	10.80	(136.29%)	0.517	-0.372	64.367%	207.5	64.306%	-0.355	-0.484	10.39	(131.11%)	8.92	10.75	11.05	789	139					
450	2.91K	9.55	9.80	22.44	9.55	(120.51%)	0.479	-0.366	63.382%	210	63.805%	-0.349	-0.522	9.14	(115.34%)	9.71	12.00	12.25	1.87K	3.51K					
89	1.72K	8.40	8.70	20.83	8.40	(106.00%)	0.441	-0.361	63.493%	212.5	63.474%	-0.343	-0.560	7.99	(100.83%)	10.60	13.35	13.60	884	460					
											▶ NOV 11 '22 (21 DAYS)													IV: 64.1%	
											▶ NOV 18 '22 (28 DAYS)														IV: 62.9%
											▶ NOV 25 '22 (35 DAYS)														IV: 61.2%
											▶ DEC 02 '22 (42 DAYS)														IV: 61.2%
											▶ DEC 16 '22 (56 DAYS)														IV: 61.5%
											▶ JAN 20 '23 (91 DAYS)														IV: 61.5%



OPTION PRICING NEWBIE GUIDE

期权定价 新手指引

2023
更新
版本

期权价格为何表述如此复杂

- 某一个“具体”的期权的价格（某一张合约的价格）

- XXX 到期日
- XXX 执行价

NOV 04 '22 (14 DAYS)												IV: 63.9%									
315	300	♦ 15.10	15.40 ♦	29.46	7.96	(100.45%)	0.626	-0.366	67.329%	200	66.426%	-0.349	-0.375	7.60	(95.91%)	6.74	♦	7.60	7.80 ♦	5.79K	3.36K
11	345	♦ 13.60	13.90 ♦	27.55	8.96	(113.07%)	0.590	-0.372	66.174%	202.5	65.736%	-0.355	-0.411	8.55	(107.89%)	7.33	♦	8.55	8.75 ♦	1.83K	163
267	2.03K	♦ 12.15	12.40 ♦	25.85	10.01	(126.32%)	0.554	-0.372	64.369%	205	64.974%	-0.355	-0.447	9.70	(122.41%)	8.12	♦	9.70	9.85 ♦	1.81K	705
6	1.77K	♦ 10.80	11.15 ♦	24.14	10.80	(136.29%)	0.517	-0.372	64.367%	207.5	64.306%	-0.355	-0.484	10.39	(131.11%)	8.92	♦	10.75	11.05 ♦	789	139
450	2.91K	♦ 9.55	9.80 ♦	22.44	9.55	(120.51%)	0.479	-0.366	63.382%	210	63.805%	-0.349	-0.522	9.14	(115.34%)	9.71	♦	12.00	12.25 ♦	1.87K	3.51K
89	1.72K	♦ 8.40	8.70 ♦	20.83	8.40	(106.00%)	0.441	-0.361	63.493%	212.5	63.474%	-0.343	-0.560	7.99	(100.83%)	10.60	♦	13.35	13.60 ♦	884	460

- 如果愿意，Futures pricing 同样可以如此表述 (TA inclination?)





OPTION PRICING NEWBIE GUIDE

期权定价 新手指引

2023
更新
版本

何来期权价格

- 很长一段时间不知答案

- 高数不及格的同学使用 Covered Call

- 所有可供交易的金融（衍生）工具的唯一决定因素是供求

- 对某一张合约的需求量增加 >>> 价格上升

- 对某一张合约的需求量减少 >>> 价格下降

Call / Put



OPTION PRICING NEWBIE GUIDE

期权定价 新手指引

2023
更新
版本

需求指引价格是什么机制

Hit the Bid & Lift the Offer

Expand All

OPTN...	VLM	BID	ASK	MARK	TIME	VALUE (%)	DELTA	THETA	IV	CLOSE	DESCRIPTION	STRIKE
											▶	OCT 21 '22 (0 DAYS)
											▶	OCT 28 '22 (7 DAYS)
											▼	NOV 04 '22 (14 DAYS)
6	1.77K	10.80	11.15	24.14	10.80	(136.29%)	0.517	-0.373		64.367%		207.5

参考:

- 股票期权新手入门超级教程 | Stock Option Ultimate Guide for Beginners (2022年更新版)

	11.35	100		11.45	100		11.45	100		11.35	100		11.25	100					
	11.25	100		11.35	100		11.35	100		11.25	100		11.15	100					
90	10.8	11.15	100	90	10.8	11.25	50	90	10.9	11.25	50	30	10.7	11.15	100	30	10.7	11.05	100
90	10.7			90	10.7			90	10.8			90	10.6			90	10.6		
90	10.6			90	10.6			90	10.7			90	10.5			90	10.5		



OPTION PRICING NEWBIE GUIDE

期权定价 新手指引

2023
更新
版本

只是角度不同

- 思考：看跌期权价格随时间流逝衰减 (caeteris paribus), 是因为需求量减少了吗?
- 未来敲入 (稳定在) ITM 的可能性又小了一点



OPTION PRICING NEWBIE GUIDE

期权定价 新手指引

2023
更新
版本

只是角度不同

- 供求 = Ultimate reason
- 也可以从其他方面分析价格变动原因





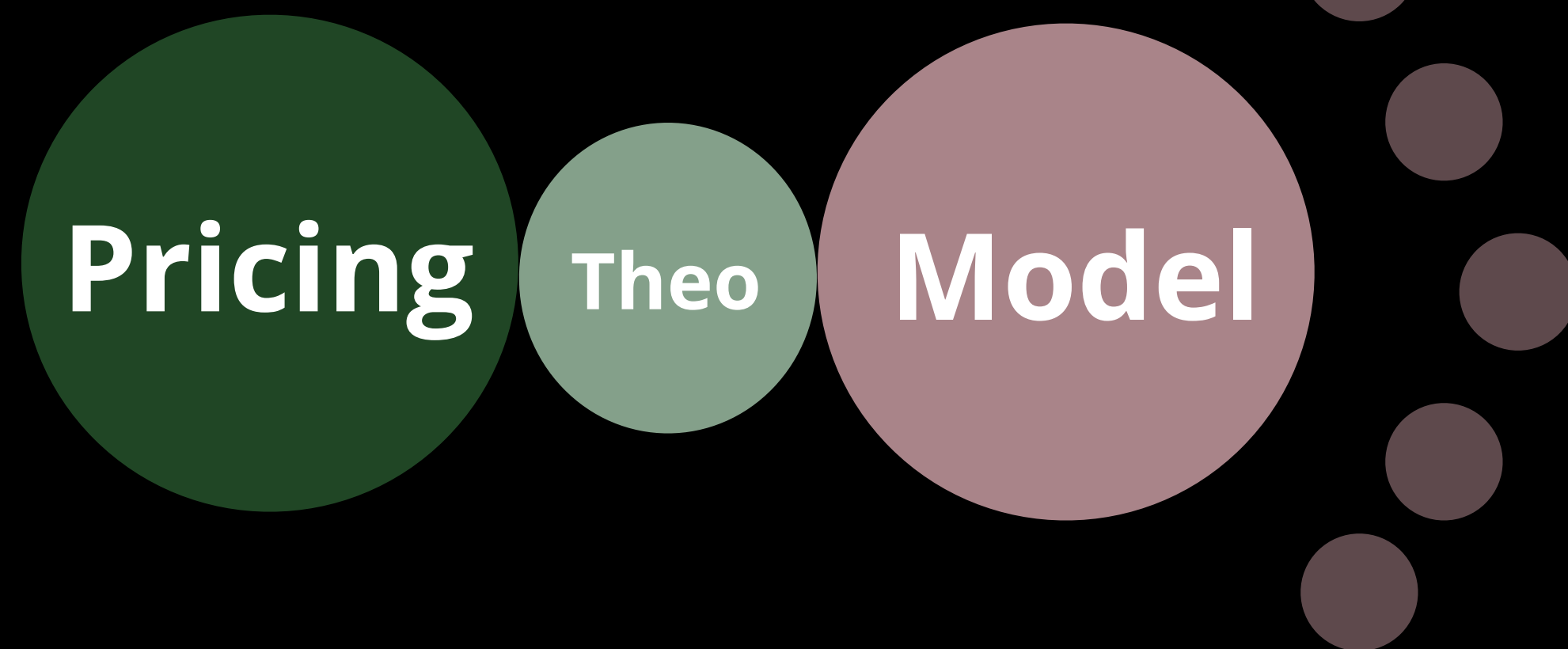
OPTION PRICING NEWBIE GUIDE

期权定价 新手指引

2023
更新
版本

定价模型 = 笼统说法

- 如何计算期权合约的价格
- **Black-Scholes Model (BSM)**
 - Current stock price 【股票随机波动的起始点】
 - Strike price 【用来计算基于锚定点的分布概率】
 - Implied Volatility 【预期未来股价随机波动的猛烈情况】
 - Time to expiration 【给予股价波动时间限制】
 - Cash dividends, R_f 【计算无风险套利成本】





OPTION PRICING NEWBIE GUIDE

期权定价 新手指引

2023
更新
版本

不同定价模型 = 不同解决问题之思路

Assumptions of the Black-Scholes-Merton Model: **股价的回报呈现对数正态分布**

- **The underlying price follows a lognormal probability distribution as it evolves through time.**

A lognormal probability distribution is one in which the log return is normally distributed. For example, if a stock moves from 100 to 110, the return is 10% but the log return is $\ln(1.10) = 0.0953$ or 9.53%. This assumption is reasonable for most assets that offer options. Additionally, the variance of the return is assumed to be constant for the life of the option.

- **Interest rates remain constant and known. 利率被假设为恒定不变**

The model uses the risk-free rate to represent this constant and known rate. During periods of rapidly changing interest rates, these 30 day rates are often subject to change, thereby violating one of the assumptions of the model. The assumption also becomes a problem for pricing options on bonds and interest rates.

- **The volatility of the underlying asset is known and constant.**

The volatility of the underlying is specified in the form of the standard deviation of the log return. This is the most critical assumption.

股价的（未来）波动率被假定为恒定不变

- **No transaction costs or taxes.**

- **No cash flows on the underlying. 不存在现金股利**

- **European exercise terms are used. 合约需要持有到期**

This limitation is not a major concern because very few calls are ever exercised before the last few days of their life. This is true because when you exercise a call early, you forfeit the remaining time value on the call and collect the intrinsic value. Towards the end of the life of a call, the remaining time value is very small, but the intrinsic value is the same.

- **BSM Model***
- **Binomial Model***
- **Trinomial Model***
- ...

定价欧式期权

定价美式期权

定价美式期权
定价非标合约



OPTION PRICING NEWBIE GUIDE

期权定价 新手指引

2023
更新
版本

只是角度不同

- 供求 = Ultimate reason
- 也可以从其他方面分析价格变动原因



参考：

- 股票期权隐含波动率新手指引 | Option Implied Volatility Guide for Beginners (2023年更新版)



OPTION PRICING NEWBIE GUIDE

期权定价 新手指引

2023
更新
版本

隐含波动率 (IV)

- IV 就是期权的价格 —— IV 升高 >>> 期权价格升高, Vice Versa
- 预期股价波动的猛烈情况

更详细内容, 参见:

股票期权隐含波动率新手指引 | Option Implied Volatility Guide for Beginners (2023年更新版)

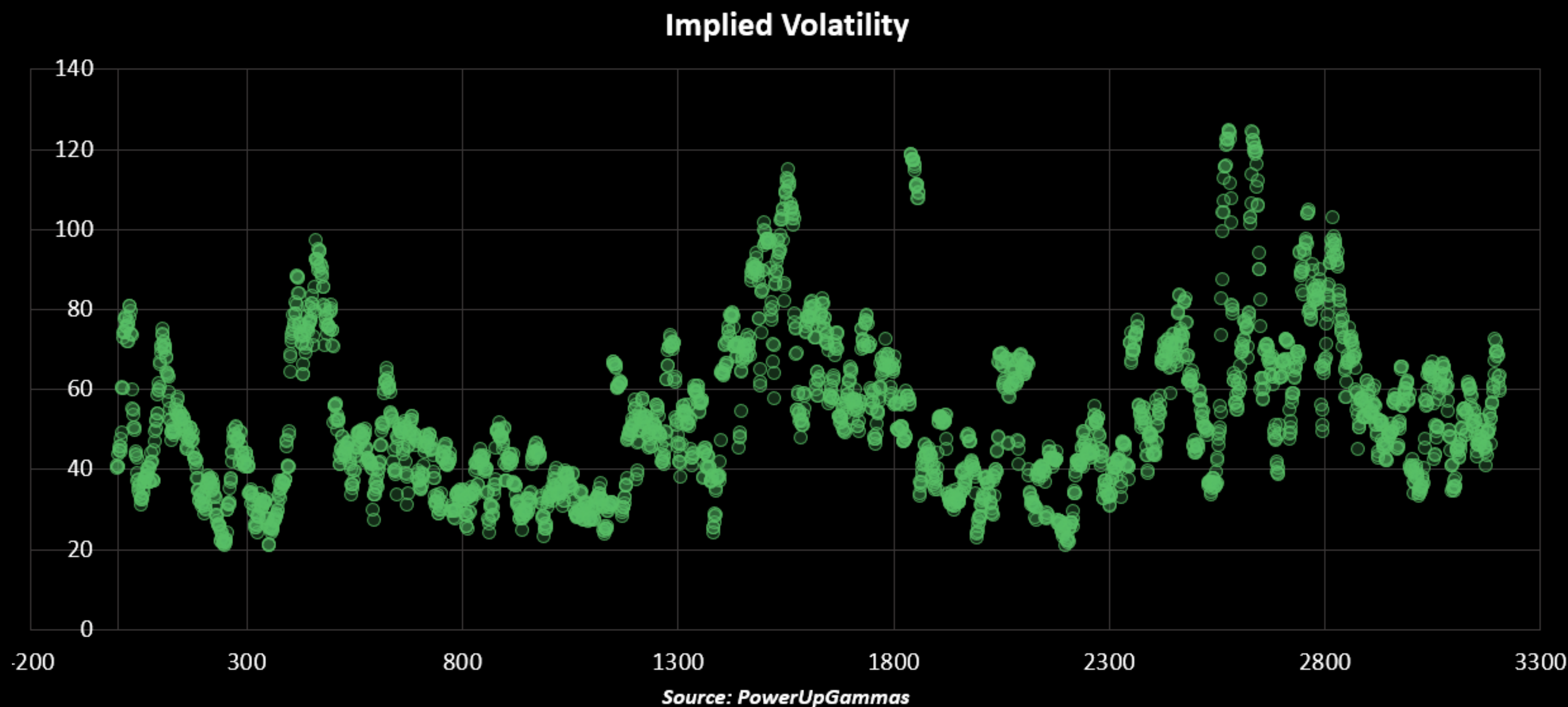


OPTION PRICING NEWBIE GUIDE

期权定价 新手指引

2023
更新
版本

隐含波动率基本特点



- 期权市场独有的波动率参数，是“市场”对未来的看法
- 随时会变，变化可能剧烈
- IV 的变化不需要股价作出反应
- 当用常识无法理解期权价格变动的时候，考虑 IV 的影响
- ~~Generalized Autoregressive Conditional Heteroscedasticity (GARCH) 广义自回归条件异方差~~



OPTION PRICING NEWBIE GUIDE

期权定价 新手指引

2023
更新
版本

隐含波动率基本特点

Historical Volatility & Implied Volatility

— Historical Volatility — Implied Volatility



- HV 和 IV 有巨大差异
- HV, IV 分别具有均值回归倾向
- HV, IV 是独立体系, 无必然联系

Historical Voalitivity & Implied Volatility

— Historical Voalitivity — Implied Volatility



Source: PowerUpGammas

Historical Voalitivity & Implied Volatility

— Historical Voalitivity — Implied Volatility



Source: PowerUpGammas

Let's Move It

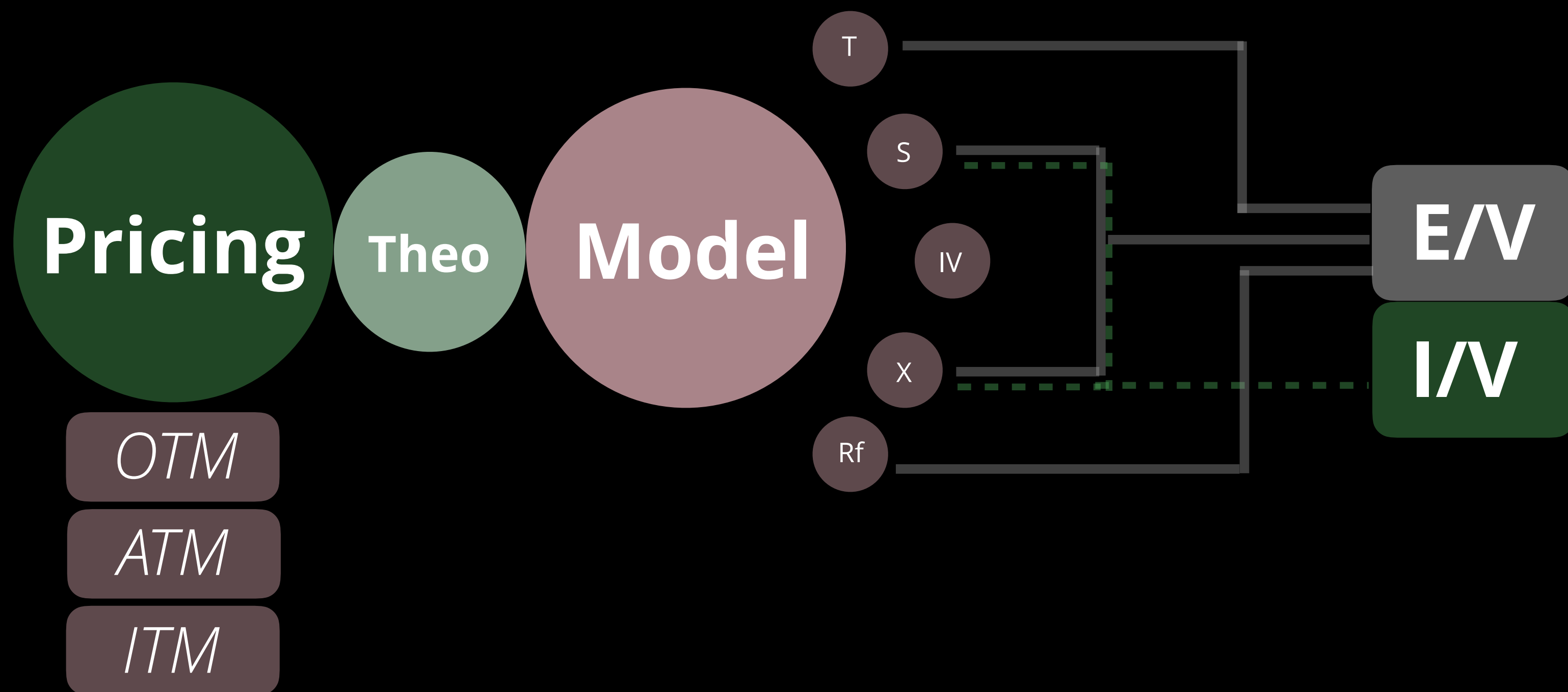


OPTION PRICING NEWBIE GUIDE

期权定价 新手指引

2023
更新
版本

期权价格拆分



更详细内容，参见：
股票期权新手入门超极教程 | Stock
Option Ultimate Guide for
Beginners (2022年更新版)



OPTION PRICING NEWBIE GUIDE

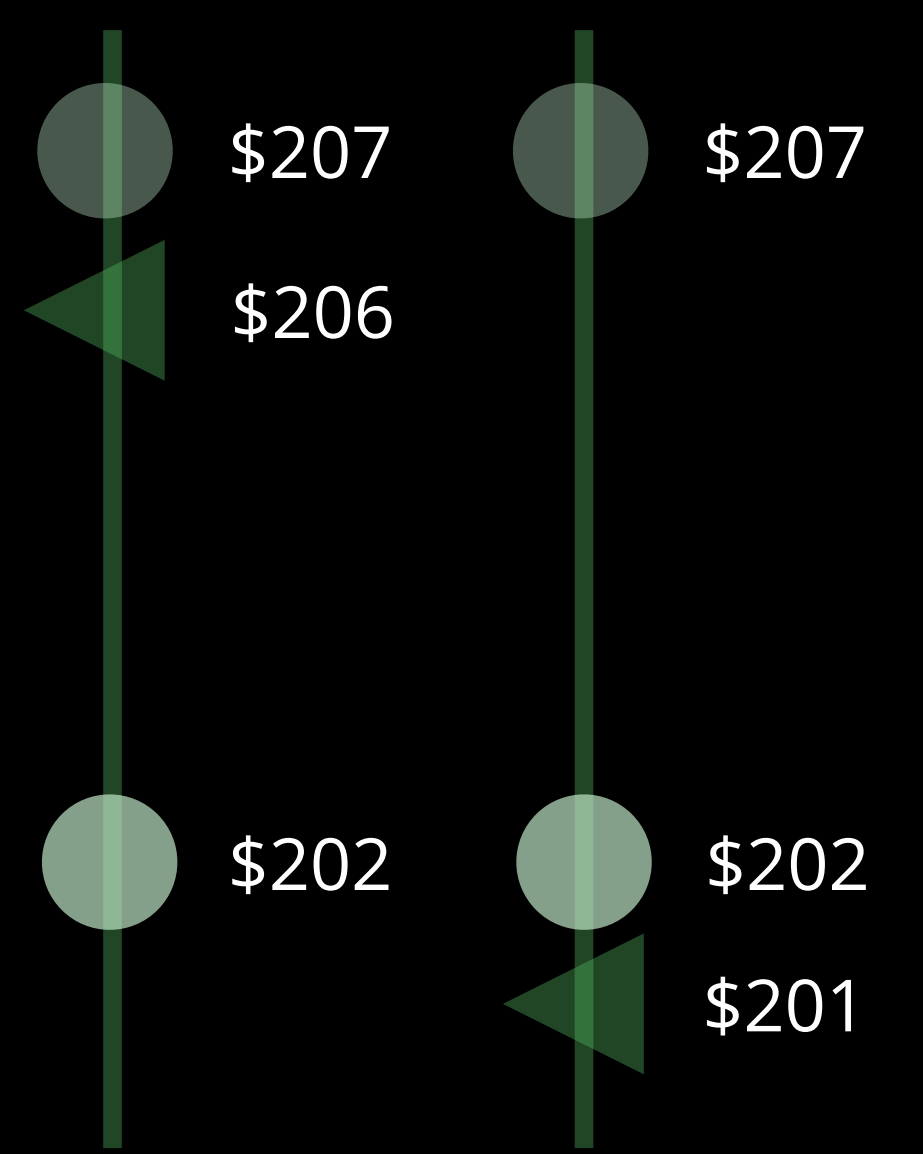
期权定价 新手指引

2023
更新
版本

注意是相对关系

- 用户疑问：股价下跌，Put Delta 为什么会升高？在期权链中，股价下跌，对应的 Delta 应该下降

CALLS										PUTS													
OPTN...	VOLU...	BID	ASK	MARK	TIME	VALUE (%)	DELTA	THETA	IV	CLOSE	DESCRIPTION	STRIKE	IV	CLOSE	THETA	DELTA	TIME	VALUE (%)	MARK	BID	ASK	VOLU...	OPTN...
										▶ OCT 21 '22 (0 DAYS) IV: 72.9% ▶ OCT 28 '22 (7 DAYS) IV: 64.0% ▼ NOV 04 '22 (14 DAYS) IV: 63.9%													
315	300	15.10	15.40	29.46	7.96	(100.45%)	0.626	-0.366	67.329%		200	66.426%	-0.349	-0.375	7.60	(95.91%)	6.74	7.60	7.80	5.79K	3.36K		
11	345	13.60	13.90	27.55	8.96	(113.07%)	0.590	-0.372	66.174%		202.5	65.736%	-0.355	-0.411	8.55	(107.89%)	8.56	8.55	8.75	1.83K	163		
267	2.03K	12.15	12.40	25.85	10.01	(126.32%)	0.554	-0.372	64.369%		205	64.974%	-0.355	-0.447	9.70	(122.41%)	8.12	9.70	9.85	1.81K	705		
6	1.77K	10.80	11.15	24.14	10.80	(136.29%)	0.517	-0.372	64.367%		207.5	64.306%	-0.355	-0.484	10.39	(131.11%)	10.75	10.75	11.05	789	139		
450	2.91K	9.55	9.80	22.44	9.55	(120.51%)	0.479	-0.367	63.382%		210	63.805%	-0.349	-0.522	9.14	(115.34%)	9.71	12.00	12.25	1.87K	3.51K		
89	1.72K	8.40	8.70	20.83	8.40	(106.00%)	0.441	-0.361	63.493%		212.5	63.474%	-0.343	-0.560	7.99	(100.83%)	10.60	13.35	13.60	884	460		
										▶ NOV 11 '22 (21 DAYS) IV: 64.1% ▶ NOV 18 '22 (28 DAYS) IV: 62.9%													





OPTION PRICING NEWBIE GUIDE

期权定价 新手指引

2023
更新
版本

Let's Wrap It Up...

- 关于定价的内容

- 更多的理解，参考：

股票期权新手入门超极教程 | Stock Option Ultimate Guide for Beginners (2022年更新版)

股票期权隐含波动率新手指引 | Option Implied Volatility Guide for Beginners (2023年更新版)

指数期权新手指引 | Index Option Guide for Beginners (2023年更新版)

- 触碰了一些概念，但提供以下结论供你实践 / 规避

- Hit the bid & Lift the offer: Level II data, Tape reading, Intraday trading
- Option contract charting
- Predicting (Near-term) Implied Volatility



OPTION PRICING NEWBIE GUIDE

期权定价 新手指引

2023
更新
版本



PowerUpGammas SCHOOL



OPTION
CRASH COURSE 期权破冰课

研修·期权投资策略
OPTION AS A STRATEGIC INVESTMENT

OASI

OPTION
AWARENESS
BUILDER

GAMMAS
TECHNICAL
LAB
技术分析实验室

QUANTITATIVE DATA ANALYSIS 101
定量数据分析入门

GAMMAS
TECHNICAL
SPECIAL 定量专题系列 | 001

IBKR
POWER COURSE
盈透·期权攻略

BUNDLE
OCC / OASI 打包购买 享受折扣

BUNDLE
OCC / OASI / IPC 打包购买 享受折扣